
Screening ethnically diverse human embryonic stem cells identifies a chromosome 20 minimal amplicon conferring growth advantage.

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Scientific Abstract:

The International Stem Cell Initiative analyzed 125 human embryonic stem (ES) cell lines and 11 induced pluripotent stem (iPS) cell lines, from 38 laboratories worldwide, for genetic changes occurring during culture. Most lines were analyzed at an early and late passage. Single-nucleotide polymorphism (SNP) analysis revealed that they included representatives of most major ethnic groups. Most lines remained karyotypically normal, but there was a progressive tendency to acquire changes on prolonged culture, commonly affecting chromosomes 1, 12, 17 and 20. DNA methylation patterns changed haphazardly with no link to time in culture. Structural variants, determined from the SNP arrays, also appeared sporadically. No common variants related to culture were observed on chromosomes 1, 12 and 17, but a minimal amplicon in chromosome 20q11.21, including three genes expressed in human ES cells, ID1, BCL2L1 and HM13, occurred in >20% of the lines. Of these genes, BCL2L1 is a strong candidate for driving culture adaptation of ES cells.

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